NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

ANIMAL MORTALITY FACILITY

(No.)

Code 316

DEFINITION

An on-farm facility for the treatment or disposal of livestock and poultry carcasses for routine and catastrophic mortality events.

PURPOSE

This practice supports one or more of the following purposes:

- Reduce impacts to surface and groundwater resources.
- Reduce the impact of odors.
- Decrease the spread of pathogens that result from the interaction of animal mortality and predators.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to livestock and poultry operations where animal carcass treatment or disposal is needed.

This practice includes disposal of both routine and catastrophic animal mortality; however, it may not apply to catastrophic mortality resulting from disease. In cases of disease related catastrophic mortality, this standard is applicable only when directed by the appropriate state or federal authority (typically the state veterinarian or USDA APHIS) to use the methods in this standard.

CRITERIA

General Criteria Applicable to All Purposes

Plan and design animal mortality facilities or processes to conform to all Federal, state, and local laws, rules, and regulations. This includes provisions for closing and/or removing the facility where required.

Evaluate and avoid or minimize impact to cultural resources, wetlands and Federal and state protected species to the extent practicable during planning, design and implementation of this conservation practice in accordance with established National and Florida policy, General Manual (GM) Title 420-Part 401; Title 450-Part 401, Title 190-Parts 410.22 and 410.26, National Planning Procedures Handbook (NPPH) Florida Supplements to Parts 600.1 and 600.6, National Cultural Resources Procedures Handbook (NCRPH), National Food Security Act Manual (NFSAM), and the National Environmental Compliance Handbook (NECH).

Design animal mortality facilities to handle routine mortality and/or catastrophic mortality.

Design all structural components integral to animal mortality management to meet the structural loads and design criteria as described in Florida NRCS conservation practice standards Waste Storage Facility, Code 313 and Roofs and Covers, Code 367, unless otherwise designated.

Divert all storm water runoff away from the animal mortality facility.

Use safety devices such as fencing, and warning signs.

Address bio-security concerns in all aspects of planning, installation, and operation and maintenance of an animal mortality facility.

Location. Locate the animal mortality facility to where movement of odors toward neighbors will be minimized.

Locate the facility down gradient from a spring or well where possible or take steps necessary to prevent contamination.

Locate animal mortality facilities above the 100-year floodplain elevation unless site restrictions require location within the floodplain. If located in the floodplain, protect the facility from inundation or damage from a 25 -year flood event.

Ensure that the location of the animal mortality facility is consistent with the overall site plan for the livestock or poultry operation. Locate the facility for acceptable ingress and egress and where it will not interfere with other travel patterns on the farm.

Seepage control. Where seepage from animal mortality facilities will create a potential water quality problem, provide a liner which meets the requirements of the Agricultural Waste Management Handbook (AWMFH), Appendix 10D, for clay liner design criteria, or other acceptable liner technology.

Vegetation. Vegetate all disturbed areas in accordance with Florida NRCS conservation practice standard Critical Area Planting, Code 342.

Additional Criteria for Routine Mortality

Locate the facility as close to the source of mortality as practical, considering bio-security issues and the need to keep the facility out of sight of the general public.

Additional Criteria for Composters

General. Design animal mortality facilities for composting animal mortality to conform to Florida NRCS conservation practice standard, Composting Facility, Code 317.

Size animal mortality composting facilities according to the methods provided in the NEH Part 637, Chapter 2 – Composting (NEH 637.0210 and NEH 637.0211) and NEH Part 651, Chapter 10 – Composting (NEH 651.1004(f)).or comparable extension publication or state rules.

Additional Criteria for Refrigeration Units

General. Use refrigeration units with a construction compatible with the mechanism to be used to empty the refrigeration unit. Provide for protecting the refrigeration unit from precipitation and direct sun as deemed appropriate. The vendor used for removing frozen animal carcasses from the farm must be approved by the state. The landowner must have a written contract with the vendor stating the vendor's responsibility for properly handling animal mortality from the farm. The schedule for removing the dead animals must coincide with the freezer capacity.

Location. Locate freezers near all-weather roads to facilitate the loading and transporting of carcasses from the farm. Where needed, construct all-weather roads to facilitate the equipment used in the removal of carcasses from the freezers. Design all-weather roads to meet the requirements of Florida NRCS conservation practice standard Access Road, Code 560.

Structural loading and design. Specify freezer units to be of the chest type with a construction compatible with the mechanism to be used to empty the freezer. Include provisions for protecting the freezer unit from precipitation and direct sun as deemed appropriate.

Ensure the freezer unit design, construction, power source, and unit installation to be in accordance with the manufacturer's recommendations. Specify freezers to be constructed of durable material with a life expectancy compatible with other aspects of the waste management system. Specify the freezer container to be leak-proof to minimize odor and leachate pollution.

Place the freezer on a pad of suitable strength to withstand loads imposed with vehicular traffic consistent with equipment used to load or remove the box or tray.

Temperature. Specify the freezers to be self contained units designed to freeze animal carcasses before decomposition occurs. For best results, maintain the temperature of the carcasses to be rendered between 22° and 26° F. Carcasses that will be incinerated or gasified should be stored at a few degrees above freezing in order to facilitate burning and to reduce the amount of fuel needed to incinerate

of gasify the carcasses. The units must be sealed against weather and air leakage.

Capacity. Size the freezer units to accommodate the normal maximum volume of mortality to be expected in the interval between emptying. When calculating the volume required, include in the volume calculations the expected mortality rate of the animal, the period of time between emptying where mortality is given on a per day basis, the average weight of the animal, and a conversion factor for weight to volume. For broiler operations use a weight to volume conversion of a minimum of 45 pounds per cubic foot. Include a removal schedule supplied by an integrator or approved vendor to support capacity calculations.

Base average mortality on mortality data over several growing cycles (excluding catastrophic losses). Base average mortality used to determine capacity on mortality data for the period of time prior to removal off-site. In the absence of specific landowner mortality data, use mortality data on similar operations in the local area.

Power source. Ensure electrical components and installation to meet the requirements of the National Electrical Code (NEC) and state and local codes for outdoor installation. Ensure all electric wiring to be in a conduit. Installation shall be certified in writing by a qualified licensed electrician.

Use an alternative source of power, where available, to maintain the integrity of the freezing process during power outages. Where an alternative power source will not be available, provide contingencies for disposal of the animal carcasses in the operation and maintenance plan.

Safety. In addition to general safety requirements, use refrigeration locks where necessary. Post highly visible waterproof warning signs, such as "INEDIBLE" or similar signs on the facility to identify the use of the freezer.

Additional Criteria for Incinerators and Gasifiers

General. Incinerator and gasifier owners or operators must obtain air construction and operating permits pursuant to Florida Department of Environmental Protection (FDEP) Rules 62-210.300(1) and 62-210.300(4)Florida Administrative Code (F.A.C.). Ensure incinerators meet the requirements contained in Rule 62.296.401(6) F.A.C. Obtain permits prior to construction and operation.

Use Type 4 (human and animal remains) incinerators that have been approved for use within the state. Gasification, which is a high temperature method of vaporizing the biomass with no direct flame with oxidation of the fumes in an after-burning chamber, will meet all applicable Florida air quality/emissions requirements.

Emissions. Do not exceed the requirements of Rules 62-296.401(1) & (6) F.A.C. for incinerator particulate matter emissions, carbon monoxide (CO) emissions, and visible emissions.

Select incinerators that will not cause or permit the discharge of air pollutants, which cause or contribute to an objectionable odor.

Combustion. The incinerator must be dual chamber burning. Design the secondary chamber to have sufficient volume for at least a 1.0 second gas residence time at 1800 degrees Fahrenheit. Ensure the actual operating temperature of the secondary chamber combustion zone to be no less than 1600 degrees Fahrenheit throughout the combustion process in the primary chamber. Do not use primary chamber and stack in calculating this residence time. Select incinerators that cremation in the primary chamber that does not initiate unless the secondary chamber combustion zone temperature is equal to or greater than 1600 degrees Fahrenheit.

Capacity. Base the minimum incinerator capacity on the average daily weight of animal mortality and the length of time the incinerator will be operated each day. In the absence of specific landowner mortality data, base incinerator capacity on similar operations in the local data.

The required minimum incinerator size shall be the smallest size available that will incinerate the required minimum capacity in 2 or 3 burns within a 24 hour period of time.

Size gasifiers to handle the average maximum daily animal mortality during a growing cycle. Refrigeration units can be used in conjunction with gasifiers to improve the loading cycle and fuel use efficiency of gasification unit.

Ashes. Remove ashes daily or according to manufacturer recommendations. Spread ash according to NRCS Florida conservation practice standard Nutrient Management, Code

590 or provide for other acceptable means of disposal.

Location. Locate the incinerator/gasifier a minimum of 20 feet or as recommended by the manufacturer. Place the incinerator on a reinforced (fiber or steel) concrete pad for stability and safety. Extend the concrete slab sufficient distance on all sides of the incinerator base to accommodate management of the facility. Design the top of the concrete slab to be a minimum of 0.5 foot above natural ground and 2 feet above the seasonal high water table on high water table soils. If the incinerator is covered with a roof, design a minimum of six inches between the incinerator chimney and any combustible component of the roof.

Place the fuel source at a distance from the incinerator, buildings, waste storage facility, and wells as recommended by the manufacturer or according to state and local rules, laws and regulations.

Power source. Ensure electrical components and installation meet the requirements of the National Electrical Code (NEC) and state and local codes for outdoor installation. Ensure all electric wiring be in a conduit. Installation shall be certified in writing by a qualified licensed electrician.

Gas hook-up must be certified in writing by a qualified licensed Liquified Petroleum contractor to meet applicable National Fire Protection Association (NFPA) codes, all other National, state and local codes, and in conformance with the manufacture's recommendations.

Install fuel storage for diesel powered units in accordance with the manufacturer's recommendations and shall meet all applicable state and local codes, rules and regulations.

Additional Criteria Applicable to Catastrophic Mortality

General. Burial and composting are the only processes by this standard. Collect and treat catastrophic mortality as soon as practical.

Location. Locate the facility as far away from neighboring dwellings and the poultry or livestock operation as site conditions permit.

Locate on sites with restricted percolation and a minimum of two feet between the bottom of the facility and the seasonal high water table unless special design features are incorporated that address seepage rates. Use AWMFH Appendix 10D for selection of sites where seepage will be restricted with normal construction techniques.

Additional Criteria for Burial Pit

General. Bury catastrophic mortality resulting from natural conditions such as temperature extremes on-site or as otherwise directed by state and local regulatory agencies. Time the burial of catastrophic mortality to minimize the effects of mortality expansion during early stages of the decay process. Where possible and permitted by state law, leave the mortality uncovered or lightly covered until bloating has occurred, or methods employed to reduce or eliminate bloating. Retain topsoil to re-grade the disposal site after the ground has settled as the decay process is completed. Stockpile soil no closer than 20 feet from the edge of the burial pit.

Remove or render inoperable all field tile (subsurface drains) within the operational area of the burial pit.

Soil suitability. Perform onsite soils investigation to determine the suitability of the site for a burial pit. Locate burial pits on soils which do not flood and which do not have a water table within two feet of the bottom of the burial pit. Avoid areas which have the presence of hard bedrock, bedrock crevices, or highly permeable strata at or directly below the proposed trench bottom. These sites are undesirable because of the difficulty in excavation and the potential pollution of underground water

Size and capacity. Size pits used for burial to accommodate catastrophic mortality using appropriate weight to volume conversions. Calculate capacity in accordance with criteria acceptable to state and local regulatory agencies. Design the burial pit to be a minimum of 4 feet wide with length necessary to accommodate mortality. Design the depth to accommodate a minimum of 2 feet of cover over the mortality. Design pit bottoms to be relatively level. Lengths may be limited by soil suitability and slope. If more than one pit is required, separate the pits by a minimum of three feet of undisturbed or compacted soil. Size the burial site to be of sufficient volume to contain the mortality with a minimum of two feet of soil cover. Provide a finished grade for the burial site that is slightly above natural ground elevation to accommodate settling and reduce ponding from precipitation. Vegetate all disturbed areas according to NRCS Florida

conservation practice standard Critical Area Planting, Code 342.

Structural loading and design. Use barriers to keep vehicular traffic a minimum of four feet of the pit edge.

Use pit excavation techniques which are OSHA compliant. For pits that are four to five feet deep, dig a step or bench 18 inches wide and one-foot deep around the perimeter of the main pit so the remaining vertical wall will not exceed four feet. For pits greater than five feet deep, provide earthen walls that are sloped back at 2 horizontal and 1 vertical or flatter.

Additional Criteria for Composting

General. Design catastrophic mortality composting to be in either passive piles or windrows as described in NEH Part 637, Chapter 2 – Composting (NEH 637.0210 and NEH 637.0211) and NEH Part 651, Chapter 10 – Composting (NEH 651.1007(f)) and in accordance with Florida conservation practice standard Composting Facility, Code 317.

Protect composting mortality from precipitation as necessary, or provisions made for collecting contaminated runoff. Cover dead animals in static piles or windrows with a minimum of 1 foot of sawdust, finished compost, or other carbonaceous material to discourage scavenging animals and minimize odors.

CONSIDERATIONS

Major considerations in planning animal mortality facilities are:

- available equipment at the operation,
- the management capabilities of the operator,
- the degree of pollution control required by state and local agencies,
- Effect on wildlife and domestic animals,
- the economics of the available alternatives, and
- effect on neighbors.

Initial planning of site suitability should include referring to the web Soil Surveys' soil interpretations for "disaster recovery planning" http://websoilsurvey.nrcs.usda.gov/.

Establish traffic patterns to avoid crossing livestock pathways and feed lanes with mortality transport.

Consider taking measures to maintain appropriate visual resources, reduce odor, and provide dust control. Vegetative screens and topography should be used to shield the animal mortality facility from public view, to reduce odors, and to minimize visual impact.

Consider prevailing wind direction and neighbors when siting animal mortality disposal facilities. Consider requiring a minimum of 900 feet to separate the facility from the nearest neighboring residence. Consider locating the facility to be 200 feet from a well, spring, or water course.

Consider diverting runoff from the livestock or poultry facility, or from outside areas away from the animal mortality disposal facility.

Composting of any mortality will be hindered if the carcasses are allowed to freeze. Dead animals or birds should be placed in the compost mix as quickly as practical or kept in a dry, non-freezing environment until added to the compost mix. Composting frozen carcasses will lengthen the amount of time needed for composting to occur and will likely require added management to ensure that proper composting temperatures are reached.

Consider specifying the diesel powered unit to meet the Florida conservation practice standard Combustion System Improvement, Code 372.

Facility sizes for composting large animal carcasses should reflect the longer compost periods required.

Consider opening animal thoracic and abdominal cavities and viscera prior to placing required cover as an alternative to prevent bloating of catastrophic mortality.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for animal mortality facility that describe the requirements for applying this practice according to this standard. As a minimum include the following in the plans and specifications

- A plan view showing the location and extent of the practice.
- Pertinent elevations of the facility.
- Location of electrical lines, gas lines, and requirements for burial and quality of materials.

- Standard details when concrete or timber is used for the facility foundation.
- Number, capacity, and quality of facility(ies).
- Location of utilities and notification requirements.
- Structural details of all components.
- Where a roof structure is used to protect the facility, include design data and building dimensions.
- Vegetative requirements
- Odor management or minimization requirement.

OPERATION AND MAINTENANCE

O & M for All Animal Mortality Facilities

Develop an operation and maintenance plan applicable to this practice that includes, but not limited to, the items listed below with the operator. The requirements in the individual operation and maintenance plan shall be consistent with the practice purposes, intended life, and design criteria. Prominently display safety considerations in the plan.

Include in the O&M plan, as a minimum, the following.

- Method and procedures of mortality disposal for normal losses
- Method and procedures of mortality disposal for catastrophic losses
- Biosecurity concerns
- Contact(s) and phone numbers of person(s) to contact in case of catastrophic losses.
- Records of date, average weight, and number of deaths
- Periodic inspections
- Prompt repair or replacement of damaged components.
- Site references and/or manufacturer or installer for trouble shooting

Additional O & M Applicable to All Normal Mortality

Animal mortality facilities will normally be operated or used on a daily basis. At each operation or use, inspect the facility to note any maintenance needs or indicators of operation problems.

Additional O & M for Incinerators and Gasifiers

Use incinerators and gasifiers only for the disposal of dead animals.

Operate units properly to maximize equipment life and minimize emission problems. Require any operator of an incinerator to be trained and licensed by the manufacturer's representative or an equivalent organization using a state-approved training program. A licensed operator must be on-site when the incinerator is in operation.

Load the incinerator according to the manufacturer's recommendations. Remove ashes frequently to maximize combustion and prevent damage to equipment. Include in the plans methods for collecting and disposing of the ash material remaining after incineration. Include in the plan an ash collection box or bucket and disposal of the ash on the land or through a community trash disposal system.

Inspect the incinerator periodically to ensure that all components are operating as planned and in accordance with the manufacturer's recommendations.

Additional O & M for Refrigeration Units

Operate freezers properly to maximize equipment life and minimize potential problems. Monitor temperatures regularly to ensure proper freezing of carcasses.

Load the freezer according to manufacturer's recommendations and not exceed the design capacity.

Use freezers only for the freezing of dead animals associated with the planned operation.

Inspect the freezer periodically (e.g. after each transfer of the carcasses to trucks for transport off-site) to ensure that all components are operating as planned and in accordance with the manufacturer's recommendations. Check for leaks and structural integrity of the freezer unit and proper freezing temperature.

Include in the O&M plan, as a minimum, the following.

- name and telephone number of the vendor responsible for removing animal carcasses from the freezers to off-farm facilities.

- schedule for removing animal carcasses from the freezer(s).
- capacity of freezer.
- maximum loading capacity of freezer(s).
- freezer operating temperature.

Additional O & M for Composters

State in the operation and maintenance plan that composting is a biological process. It requires a combination of art and science for success. Hence, the operation may need to undergo some trial and error in the start-up of a new composting facility.

Include in the O&M plan recipe ingredients and sequence that they are layered and mixed, maximum and minimum temperature for operation, land application rates, moisture level, management of odors, testing, etc. Make adjustments throughout the composting period to ensure proper composting processes.

Inspect the compost facility regularly when the facility is empty. Replace deteriorated wooden materials or hardware. Patch concrete floors and curbs as necessary to assure water tightness. Examine roof structures for structural integrity and repaired as needed. Inspect exposed metal components for corrosion. Wire-brush and paint corroded metal as necessary.

Closely monitor temperatures above 165°F. Take action immediately to cool piles that have reached temperatures above 185°F.

Include the method, procedure, and record keeping requirements for proper utilization of compost.

Additional O & M Applicable for Catastrophic Mortality

Identify potential locations for catastrophic animal mortality disposal. Maintain recordkeeping of number, average weight, cause, and date of animal deaths. Provide the landowner with contact information for state authorities since they may have specific requirements dependent upon cause of death, livestock species and housing

Where composting is used for catastrophic mortality disposal, the operation and maintenance plan shall identify the most likely compost medium, possible compost recipes, operational information, and equipment that will need to be readily available.

REFERENCES

Agricultural Waste Management Field Handbook (AWMFH)
ASTM C1227-00b Standard Specification for Pre-cast Septic Tanks
Florida NRCS Conservation Practice Standards
  Waste Storage Facility, Code 313
  Roofs and Covers, Code 367
  Access Road, Code 560
  Composting Facility, Code 317
  Critical Area Planting, Code 342
  Combustion System Improvement, Code 372
  Nutrient Management, Code 590
Florida Department of Environmental Protection Chapters
  62-4 F.A.C.
  62-210 F.A.C.
  62-296 F.A.C.
  62-297 F.A.C.
General Manual (GM)
  Title 420-Part 401
  Title 450-Part 401
  Title 190-Parts 410.22 and 410.26
National Cultural Resources Procedures Handbook
National Electrical Code
National Engineering Handbook, Part 637, Chapter 2, Composting
National Engineering Handbook, Part 651, Chapter 10, Composting
National Engineering Handbook, Section 6, Structural Design
National Environmental Compliance Handbook
National Food Security Act Manual
National Planning Procedures Handbook
  Florida Supplements to Parts 600.1 and 600.6